



A project of Volunteers in Asia

Construction Manual for 3500 gal. Ferrocement
Water Tank

by: E. H. Robinson

Published by:

Christian Action for Development in the
Caribbean
P.O. Box 616
Bridgetown
Barbados

Paper copies are \$ 2.50.

Available from:

Christian Action for Development in the
Caribbean
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Barbados

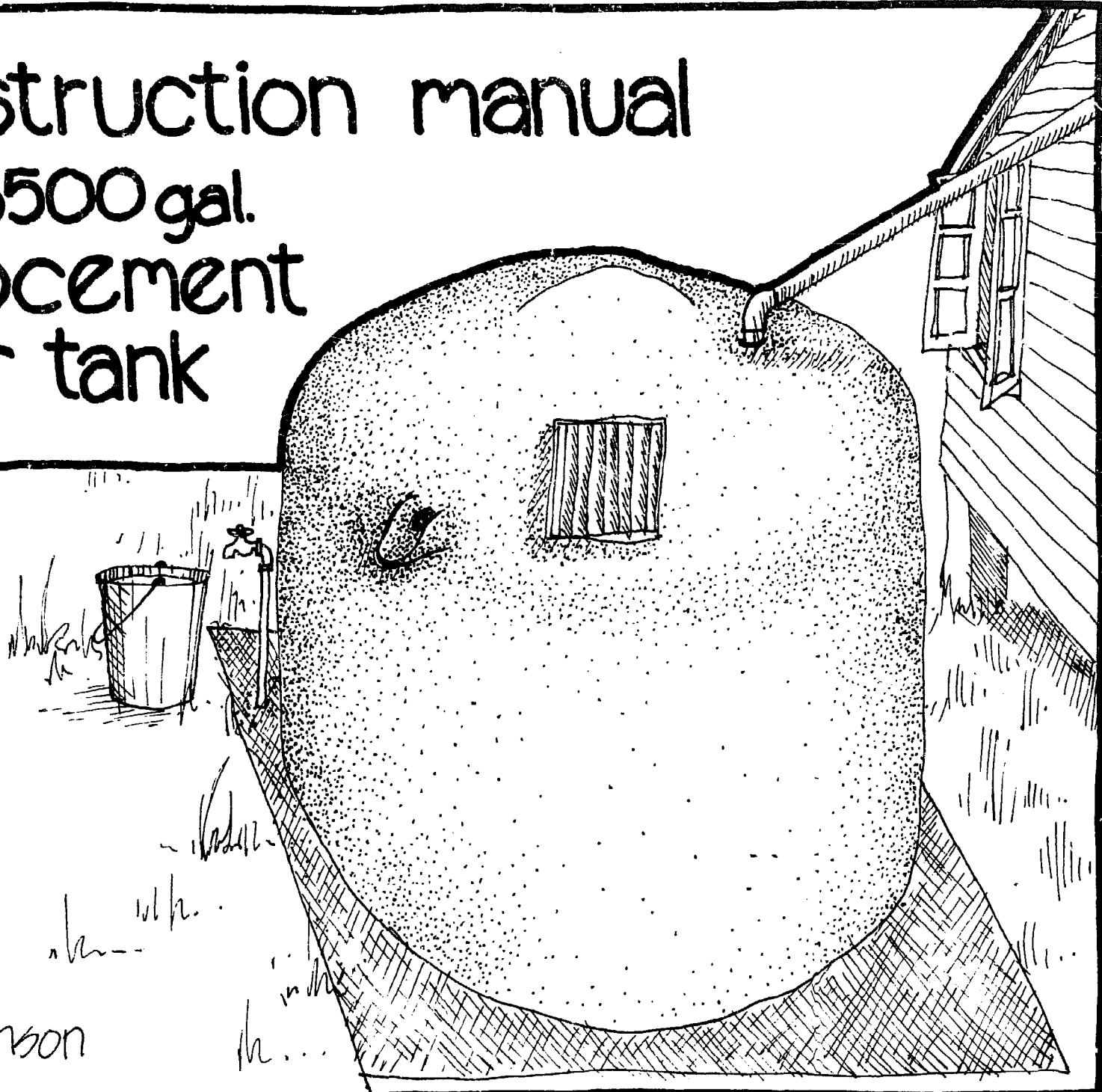
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construction manual for 3500 gal. ferrocement water tank



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equipment :

shovels
pickaxe
hammer
woodsaw
hacksaw
string line

water containers
wire snips
trowel
spirit level
tape measure
wheel barrow

materials list: formwork

3' x 3' galvanized sheeting

16 sheets - 6' x 30" corrugated galvanized

2 - 2x4x10

2 - 2x4x12

16 - 2x2x12

2 - 1x2x12

2 lbs - 2" and 2 1/2" nails

\$ _____

note: the formwork is reusable and for projects involving more than one tank, the cost of the formwork can be shared.

materials list: the tank

	\$
water tap (1/2") 3-90° elbows; 1'-1/2" galv. pipe; 1-1/2" tap	_____
4 rolls soft tie wire	_____
32 sacks cement	_____
56 lengths - 20' x 1/4" steel	_____
3 lengths - 20' x 1/2" steel	_____
35 yds of 4' wide, 1" hex mesh wire (galvanized)	_____
1 - 2x2x10' (hatch cover)	_____
1 - 2'x2' galvanized sheeting (hatch cover)	_____
1 - 1'x2' fine screen mesh (insect protection)	_____
waterproofing agent for cement mortar	_____

60 cu. ft. of 4" stone	_____
60 cu. ft. of 2" stone	_____
38 cu. ft. of sand	_____
14 cu. ft. of gravel	_____

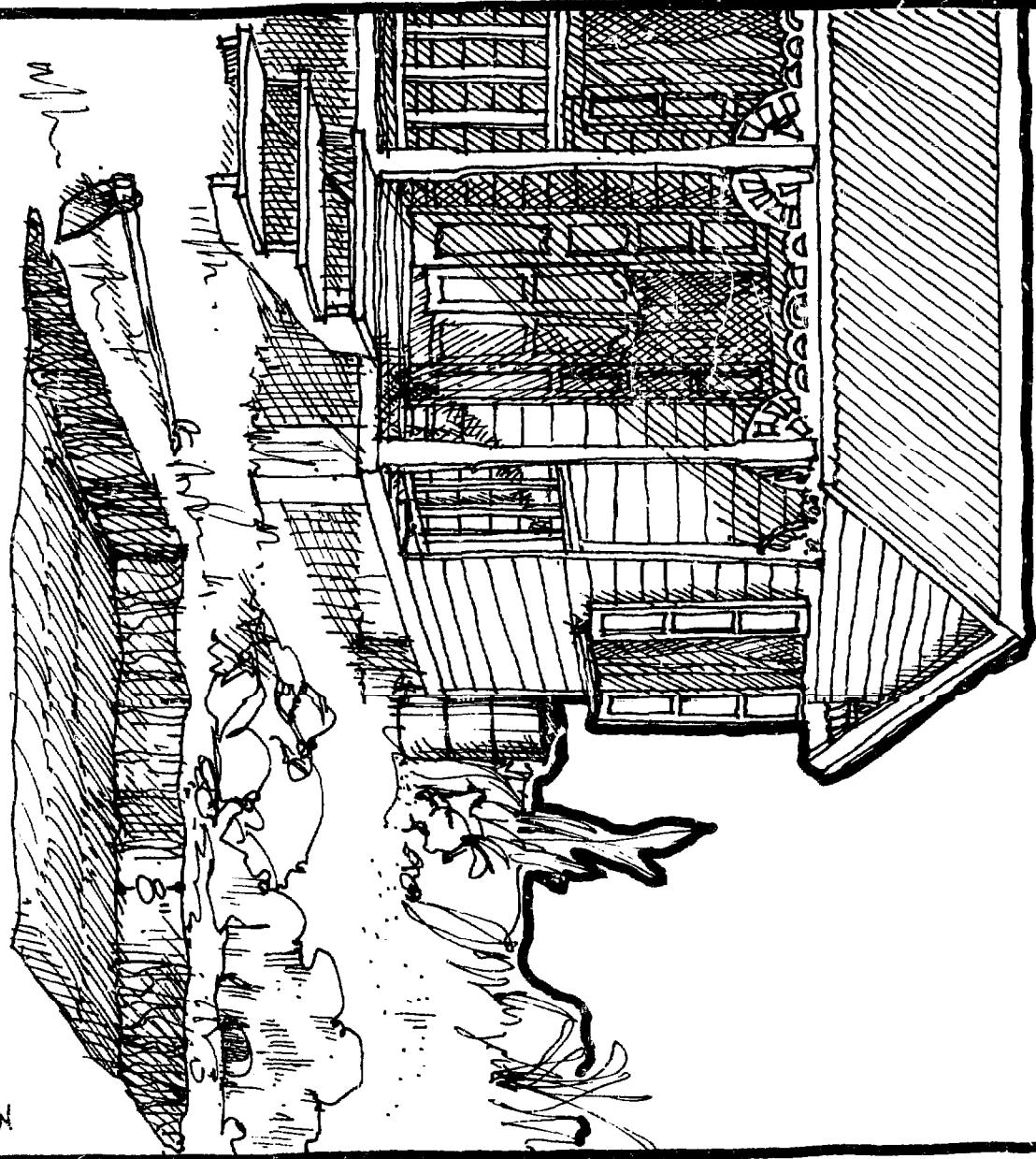
tank dimensions: 10' diameter
6' wall height
7'-6" to roof top

\$ _____

a pit is dug for the foundation of the tank.

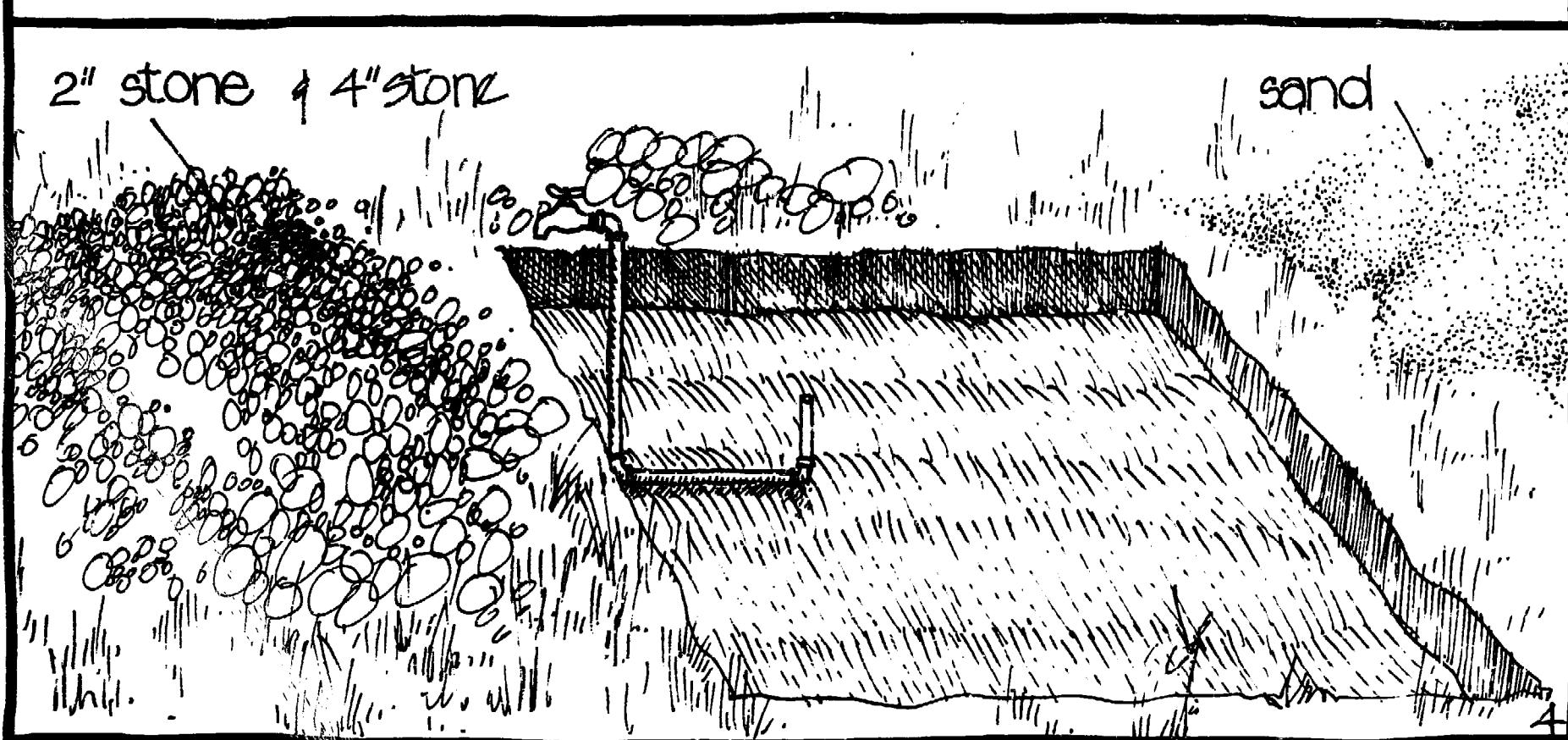
the pit measures
12 feet x 12 feet

and should be a minimum of 8 inches in depth if on solid, undisturbed earth. On clay and fill, the pit should be at least 12" deep.



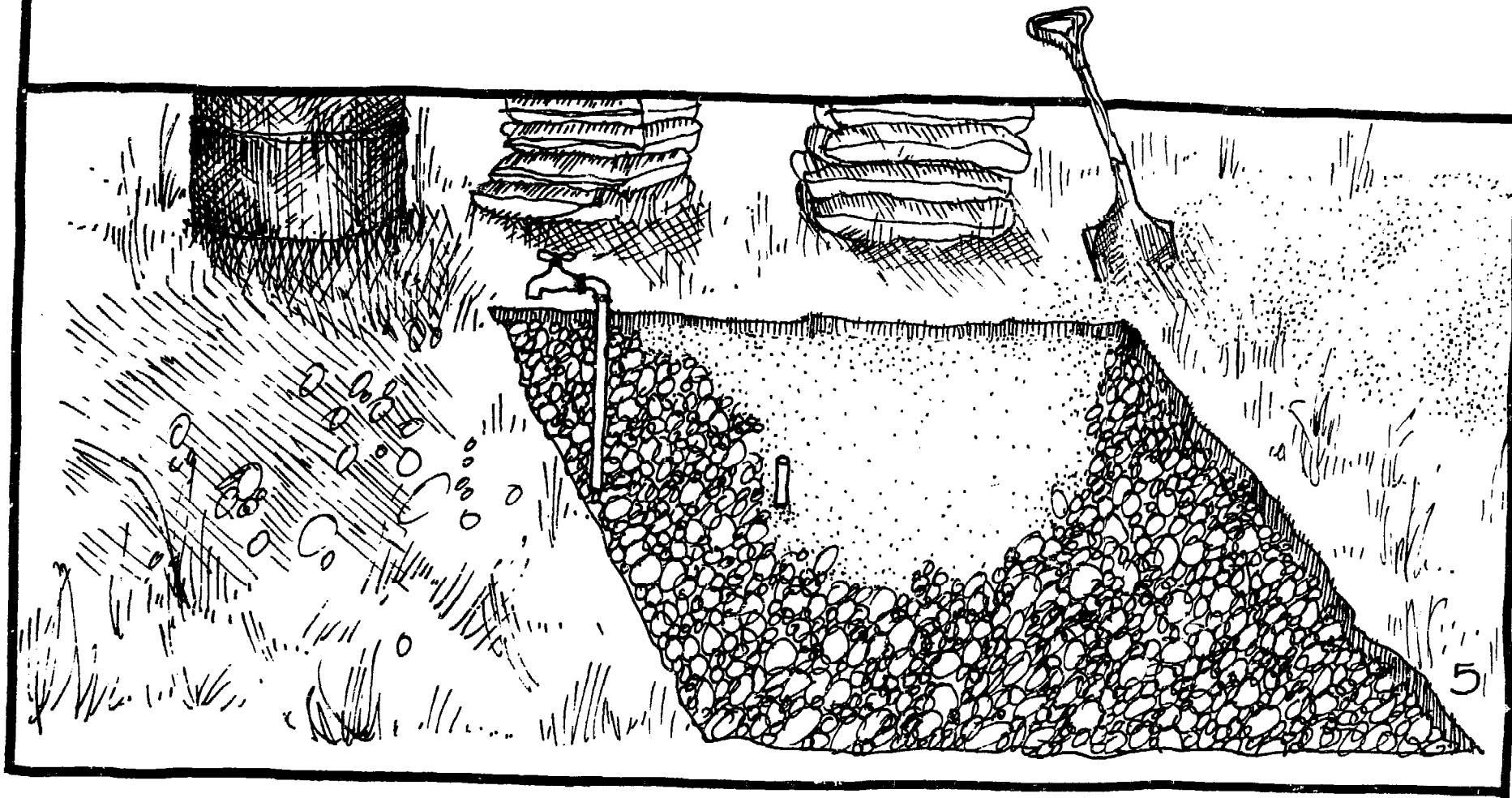
the water pipe with tap is placed at the desirable location and then the pit is filled with a layer of 4" stone and then a layer of 2" stone. this is then covered with a thin layer of sand.

note: place the tap about 6" from the edge of the pit.

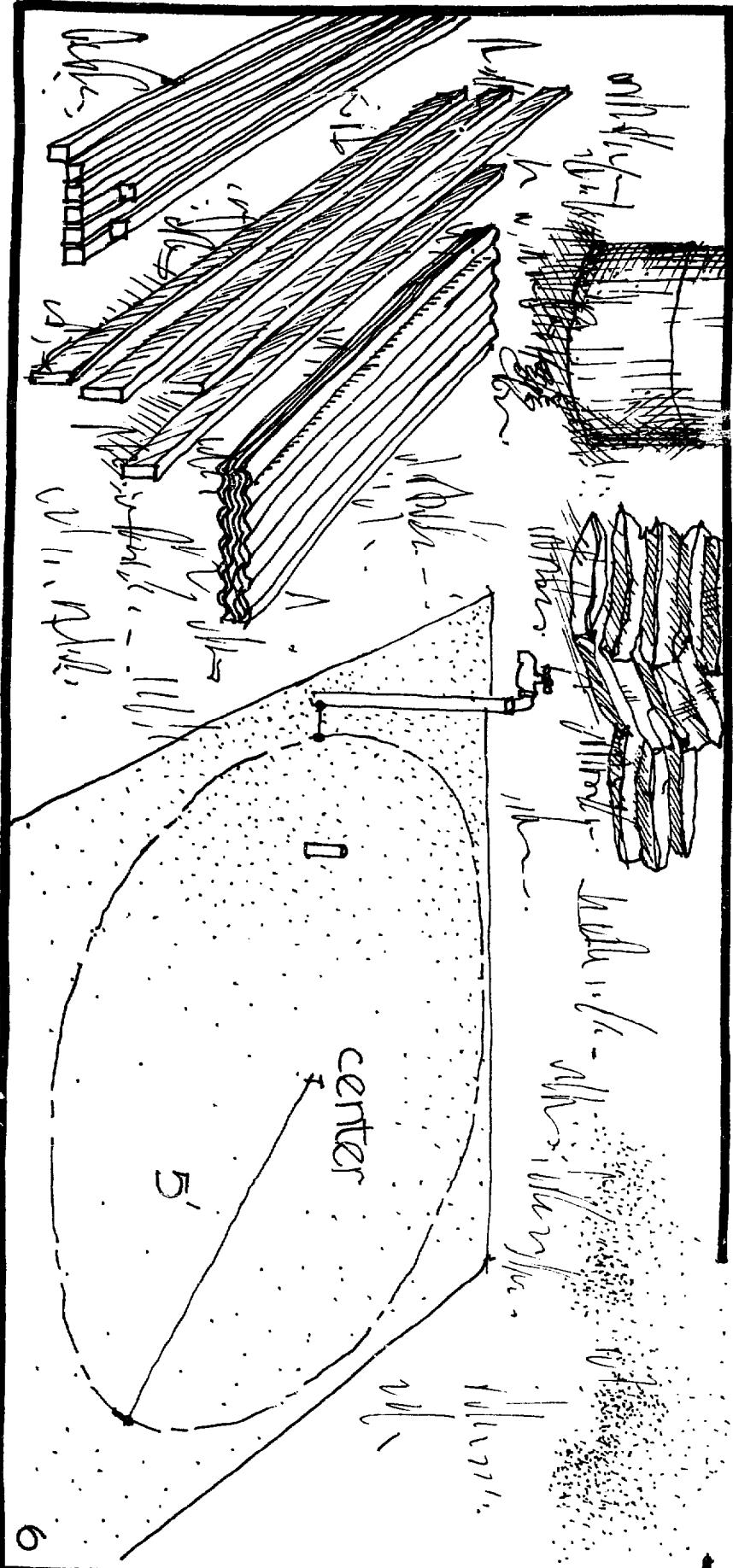


cement mixed: 1 part cement to 2 parts sand
to 4 parts gravel.

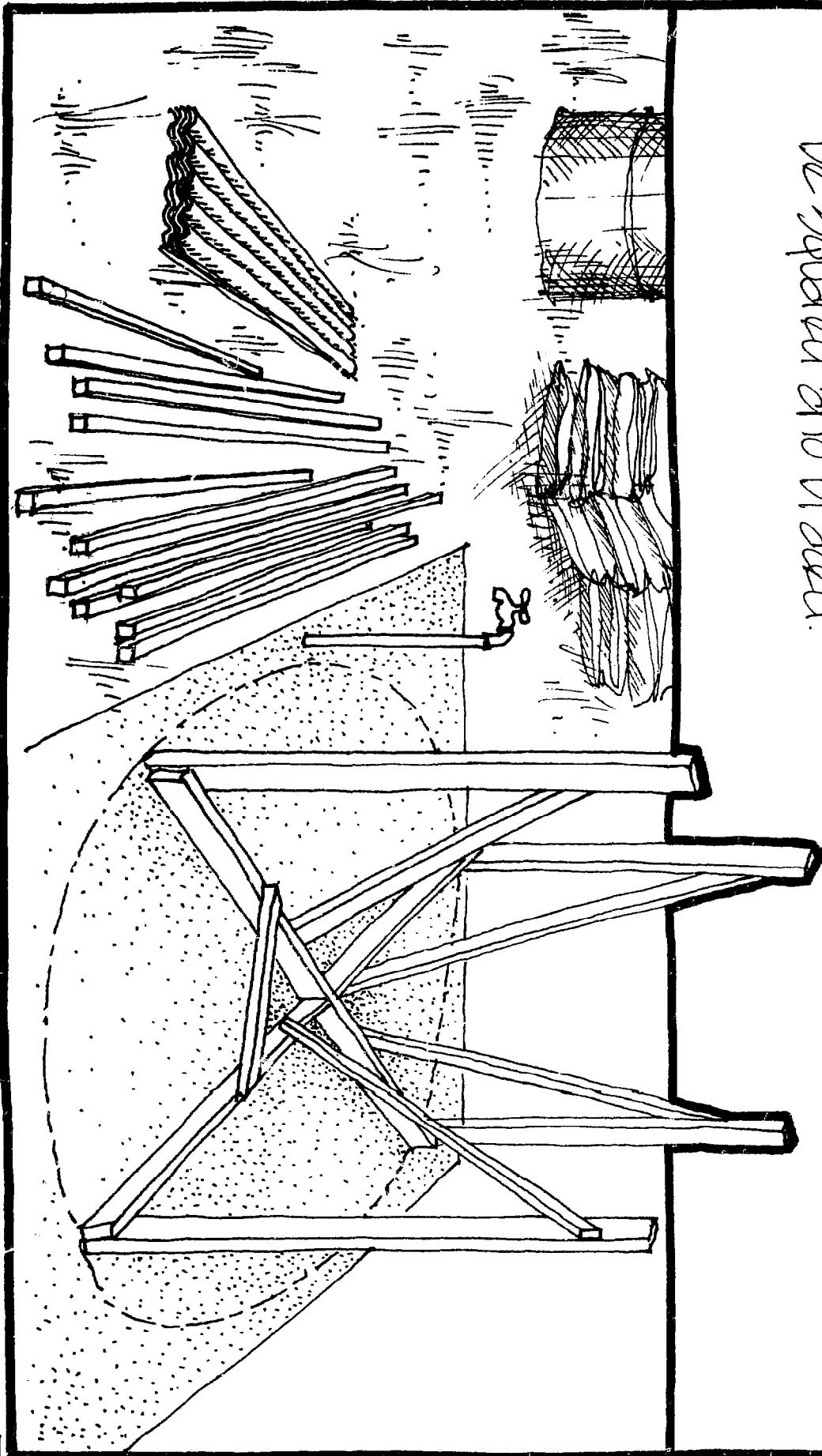
a 3" depth concrete slab is then cast covering the
12' x 12' stone and sand bed and securing the water
pipe. this is allowed to dry.

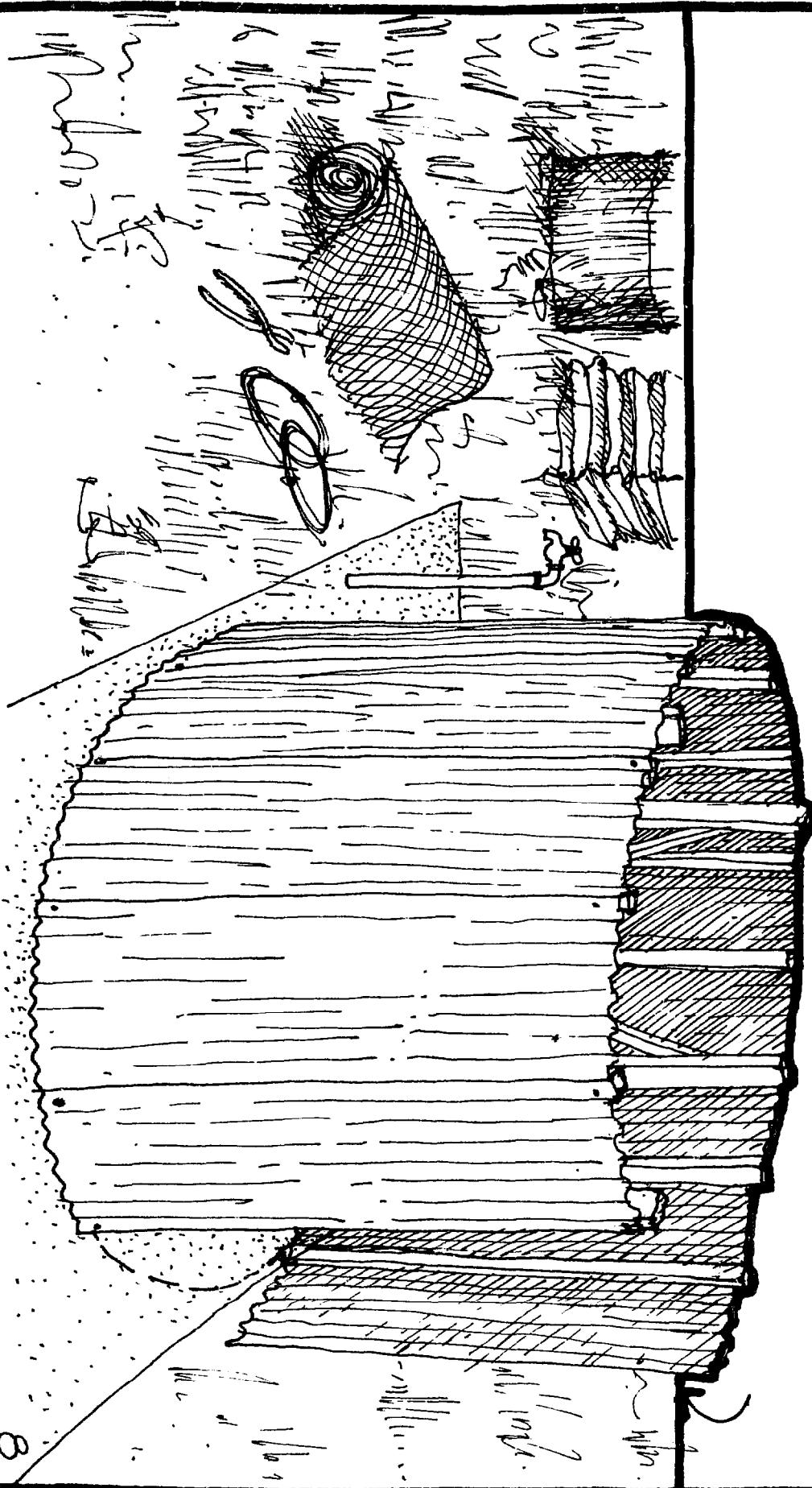


When the slab has dried, the center point of the slab is marked with a driven nail to which is tied a 5 foot length of string having chalk tied to the other end. This marks a 10 ft. circle for the positioning of the formwork. The circle should be adjusted to clear the water tap by 4 to 6".



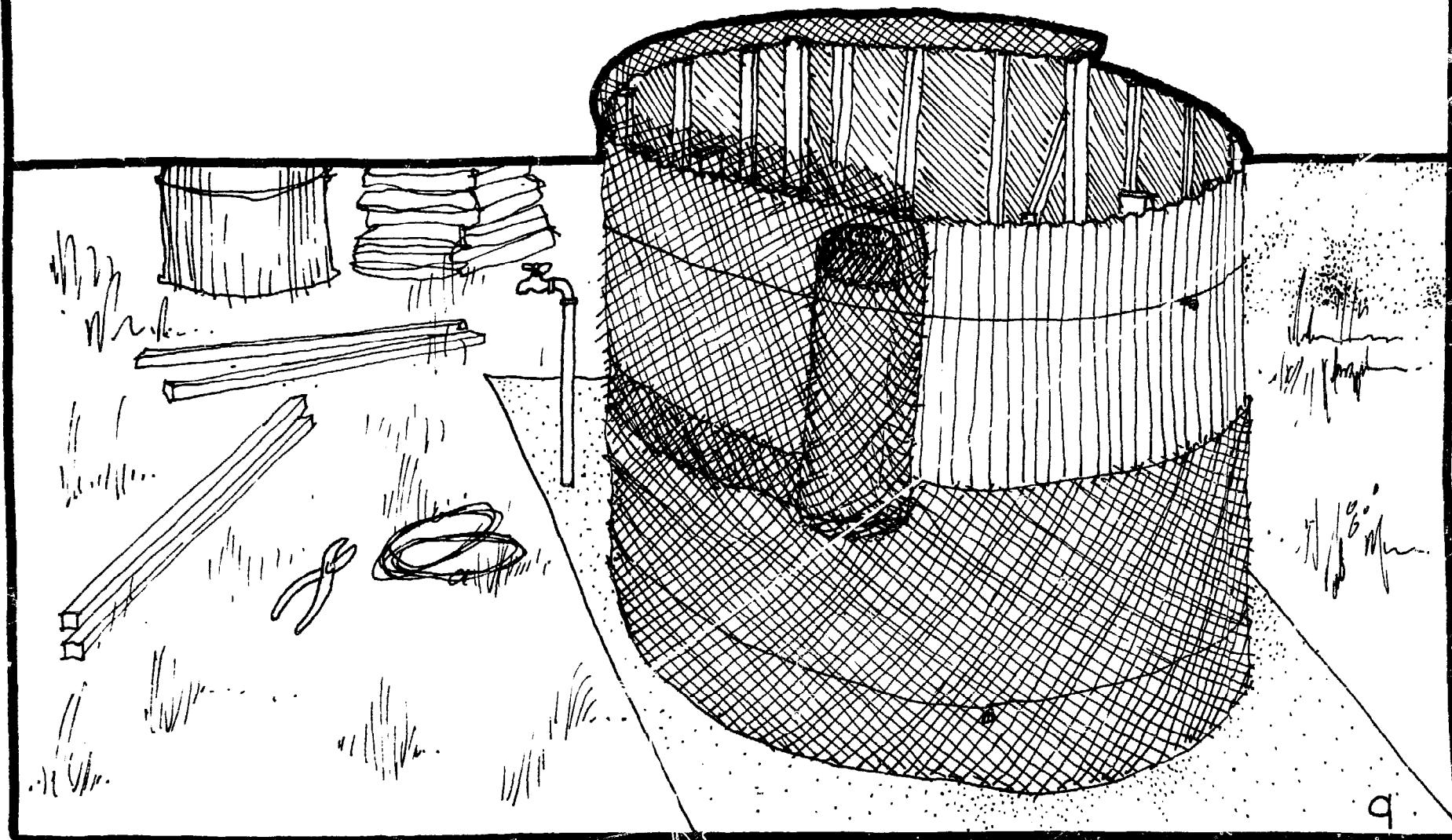
the loft. Posts are notched half way to make an equal cross and secured to the slab. The 12 ft 2x4's are cut into loft lengths and nailed upright to the 4 ends of the cross. The uprights are then plumbed and braced with 2x2's. The cross should also be squared and braced.



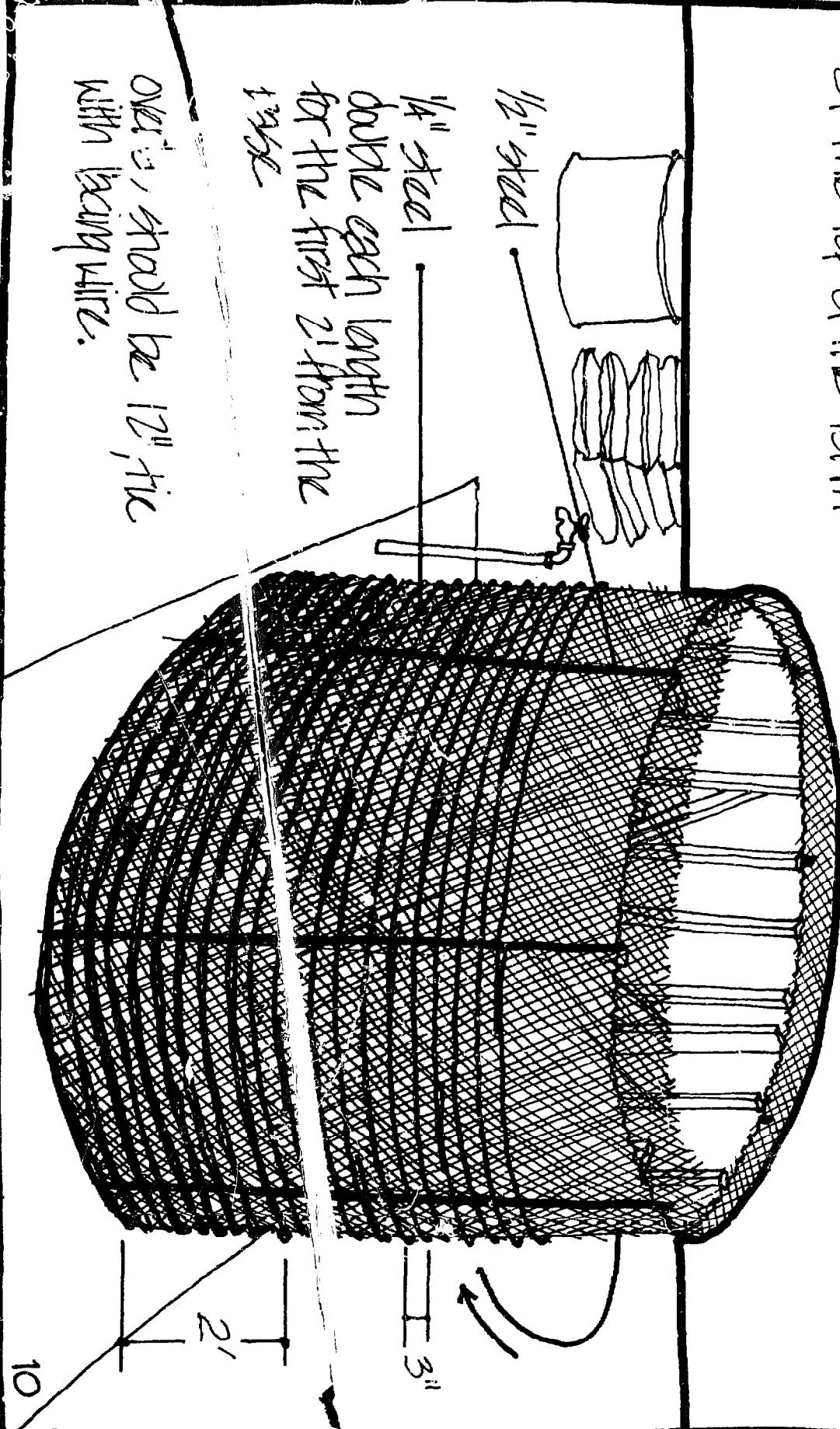


the roofing sheets are nailed to 6 ft. 2x2's and overlapped 1 corrugation. loosely nail at the top and bottom for easy removal. The sheets are fastened to the 2x4 uprights leaving one sheet un-nailed allowing entry for someone to construct a brace at the top, plumbing all the 2x2 posts from the inside.

soft wire can be tied tightly around the galvanised sheets at top and bottom allowing you to pull out the nails holding up the sheets. wire mesh is then rolled around the sheeting overlapping in the middle and overhanging the top. wire mesh must extend under the sheets to the inside of the tank. the wire mesh should be tightly tied.



6 lengths of $1/2"$ steel are bent upright at equal spacings around the outside of the form. $1/4"$ steel is then bent around the uprights at 3' spacing between each loop. The steel is tied end to end with a 12" overlap and spiraled around the tank form continuously. The $1/4"$ steel should run two together for the first 2 feet and spiral at the top of the form.



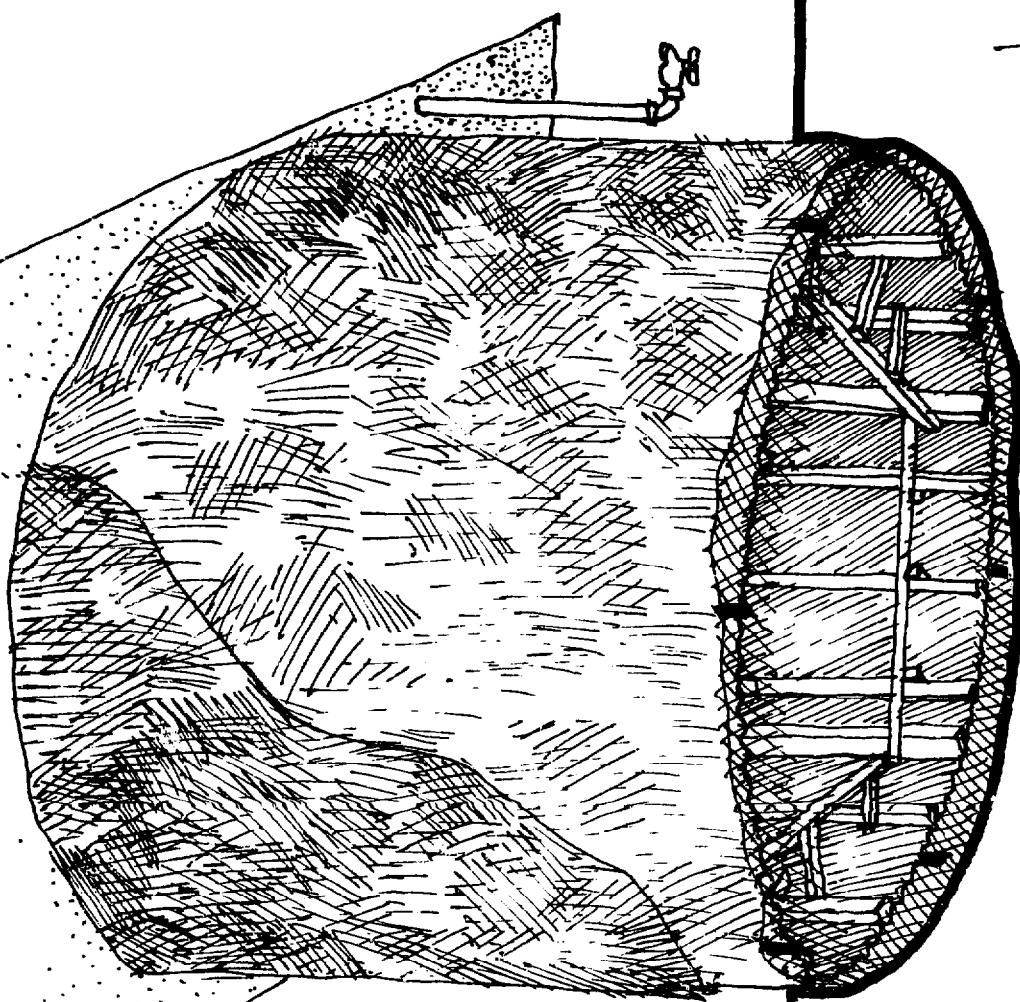
a first coat of cement plaster is applied (trowelled) onto the outside of the tank form.

This is allowed to dry before a 2nd coat is applied. leave the double band of $1/4$ " steel around the top exposed so that the steel for the top may be tied along this ring.

cement mortar mix:

1 part cement to
3 parts sand.

1:3



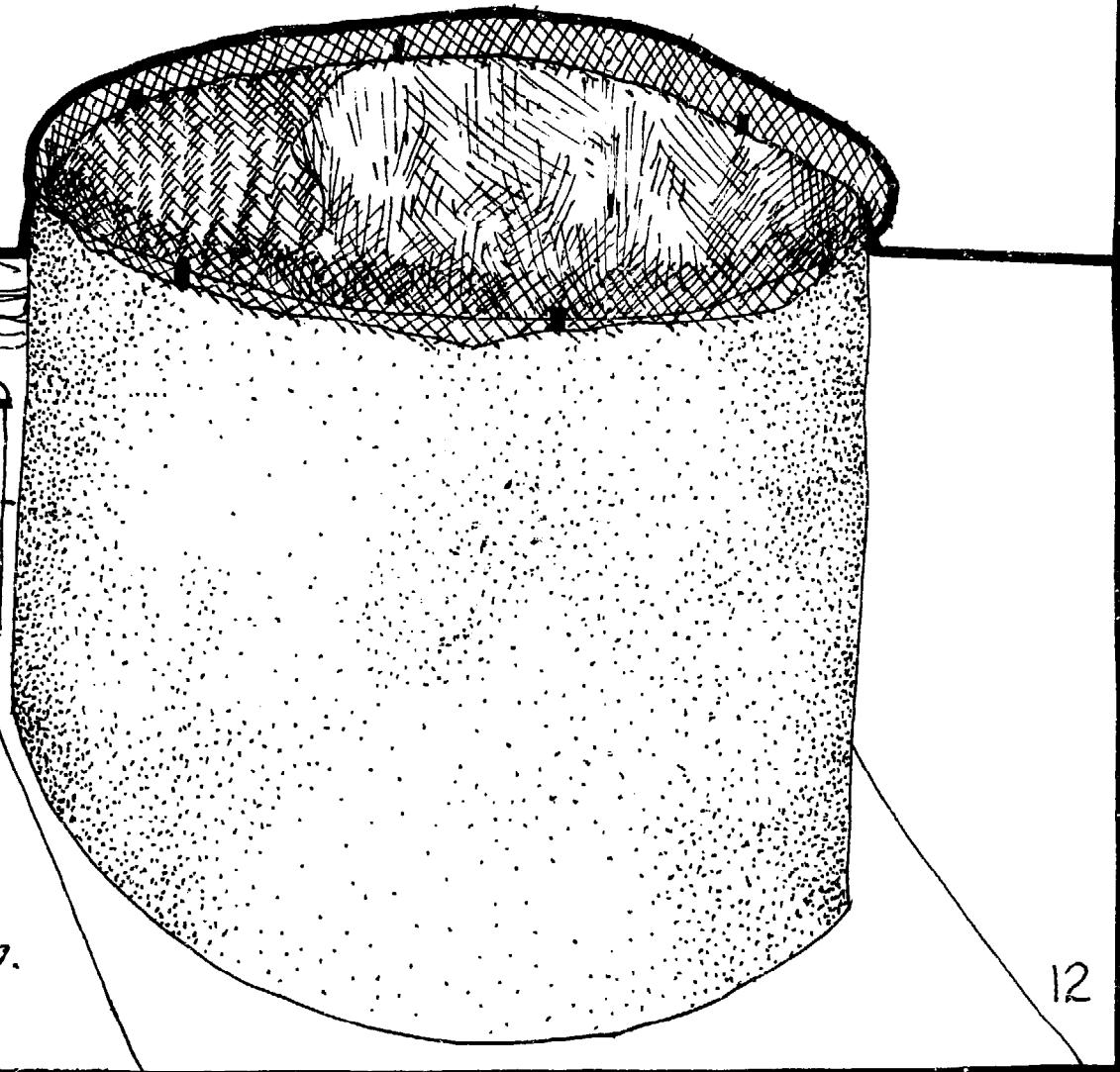
the finish coat of plaster is applied to the outside of the tank, and after removing the formwork, a first coat of mortar is trowelled onto the inside walls as well as a 2" layer poured for the floor at the same time. (after wall is coated.)

note: 2 inch thick floor
is made from the
same 1:3 mix.



Important:

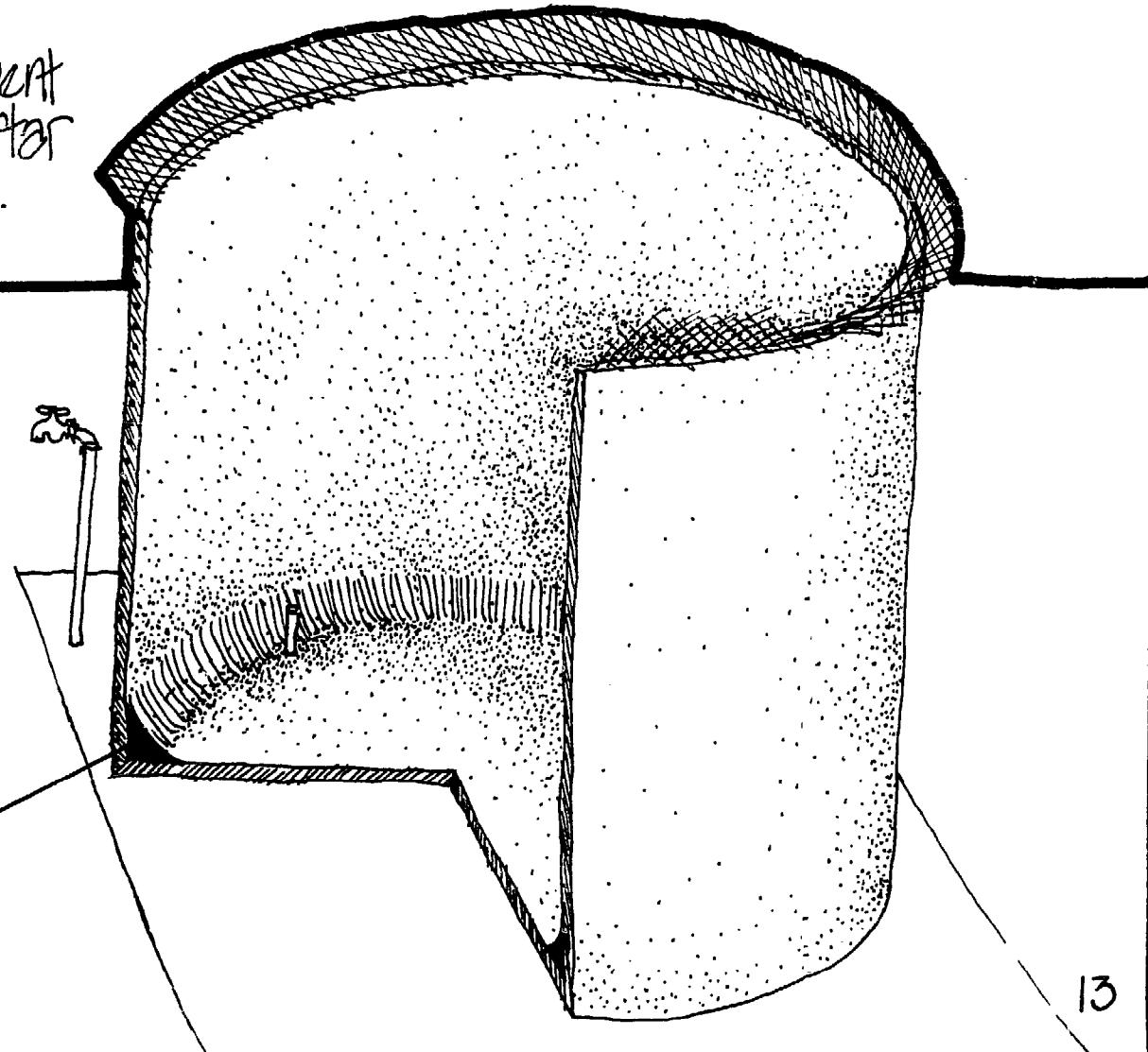
Keep walls wet once cement has hardened so that the tank "cures" properly. This should continue for 7 days.



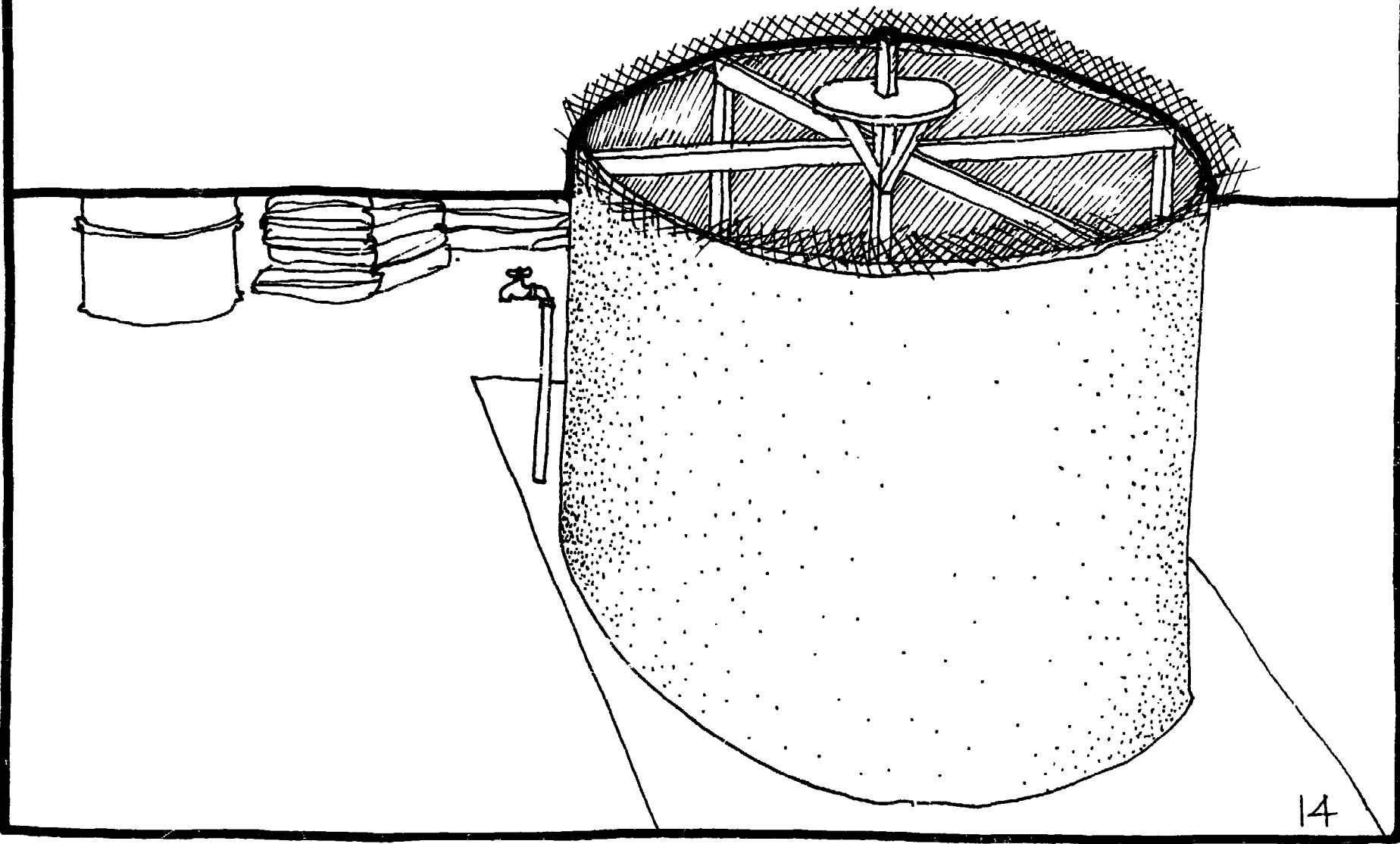
After the first coat of plaster on the inside of the wall has dried, and the floor has hardened, build up a 3 inch thick layer of mortar along the joint between the wall and floor. A finish coat is then applied to the wall.

Note: a waterproofing agent may be added to the mortar mix used on the inside.

3" thick cement
mortar to cover joint
between wall & floor

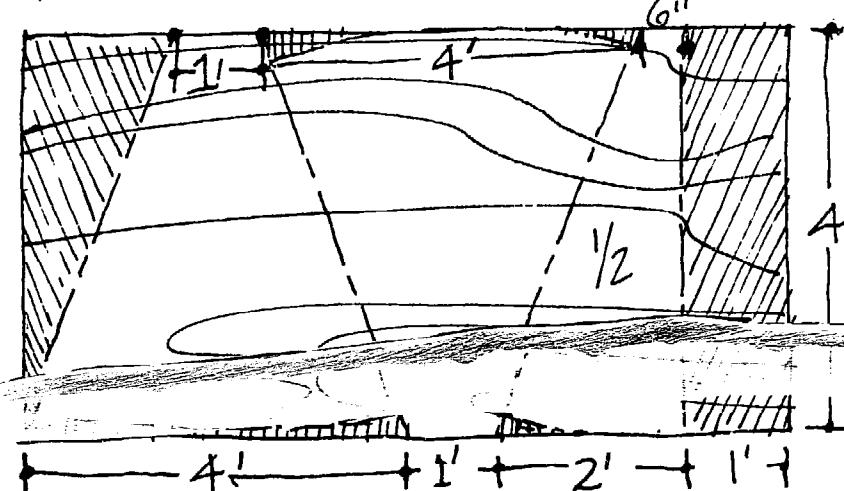
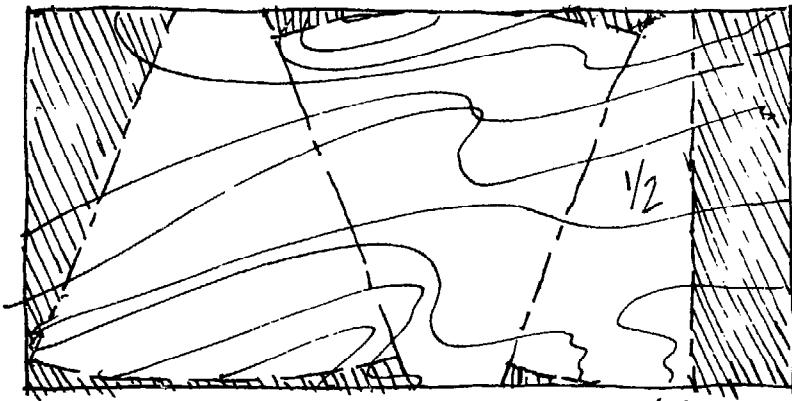
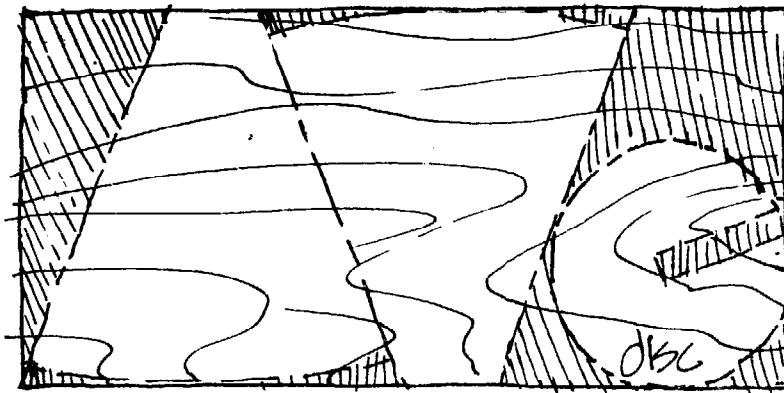


once the finish coat has dried, formwork to support the roof is constructed. an 7'-6" 2x2 is braced in the tank's center. A 2'-6" diameter plywood disc is braced to the 2x2 upright - 6" below the top of the 2x2 Upright.



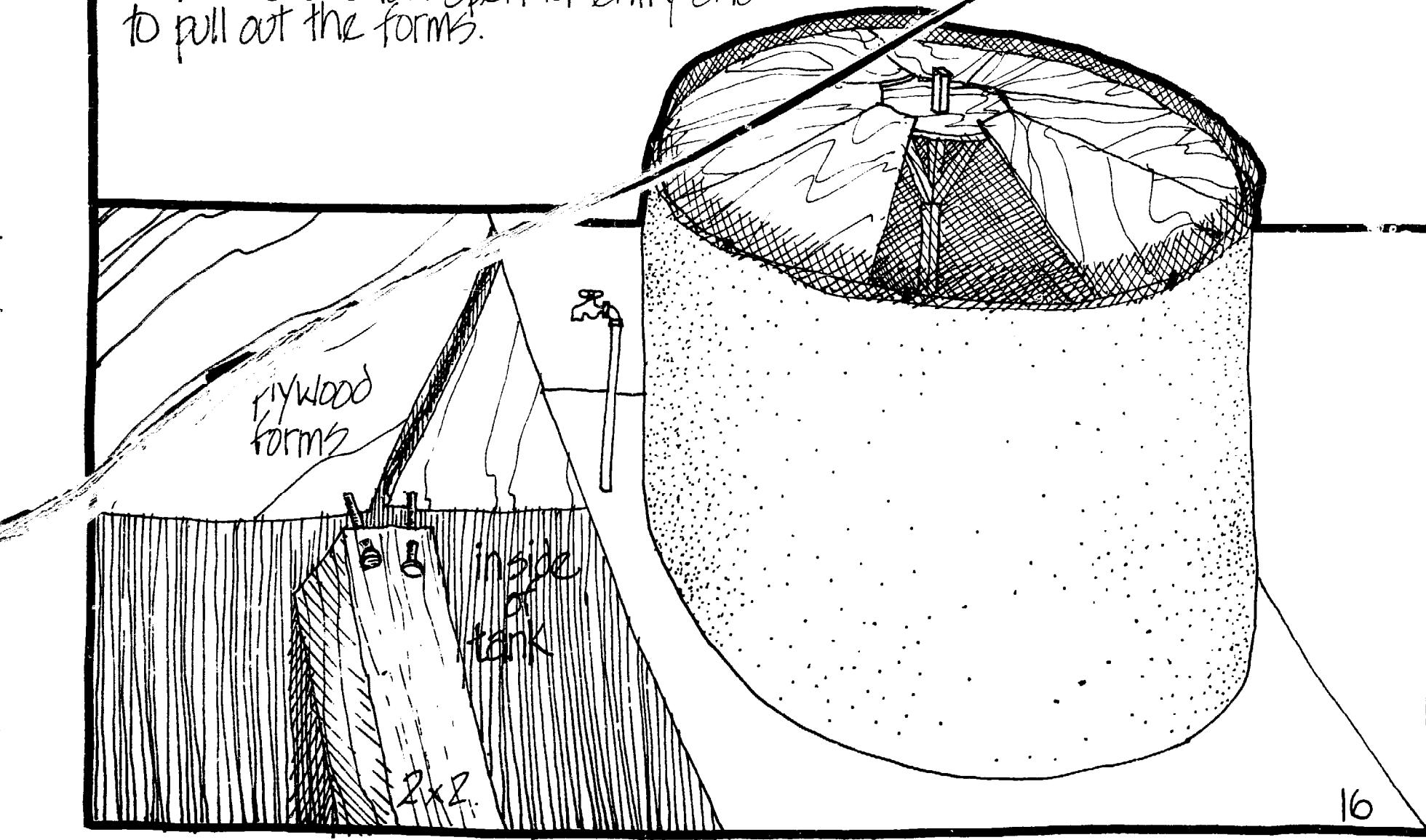
the forms for the roof are cut from 4'x8' sheets of 1/2" plywood in the patterns shown. The wedge shaped forms are cut at a slight "round" along the bottom to fit inside the tank kall.

The 2'-6" diameter plywood disc is also cut from one board. The cutting will make 7 wedge forms, one in 2 halves that can be braced together and used for the hatch section which is cast after the roof is plastered with a finish coat on all but the one section, left open to remove the formwork.

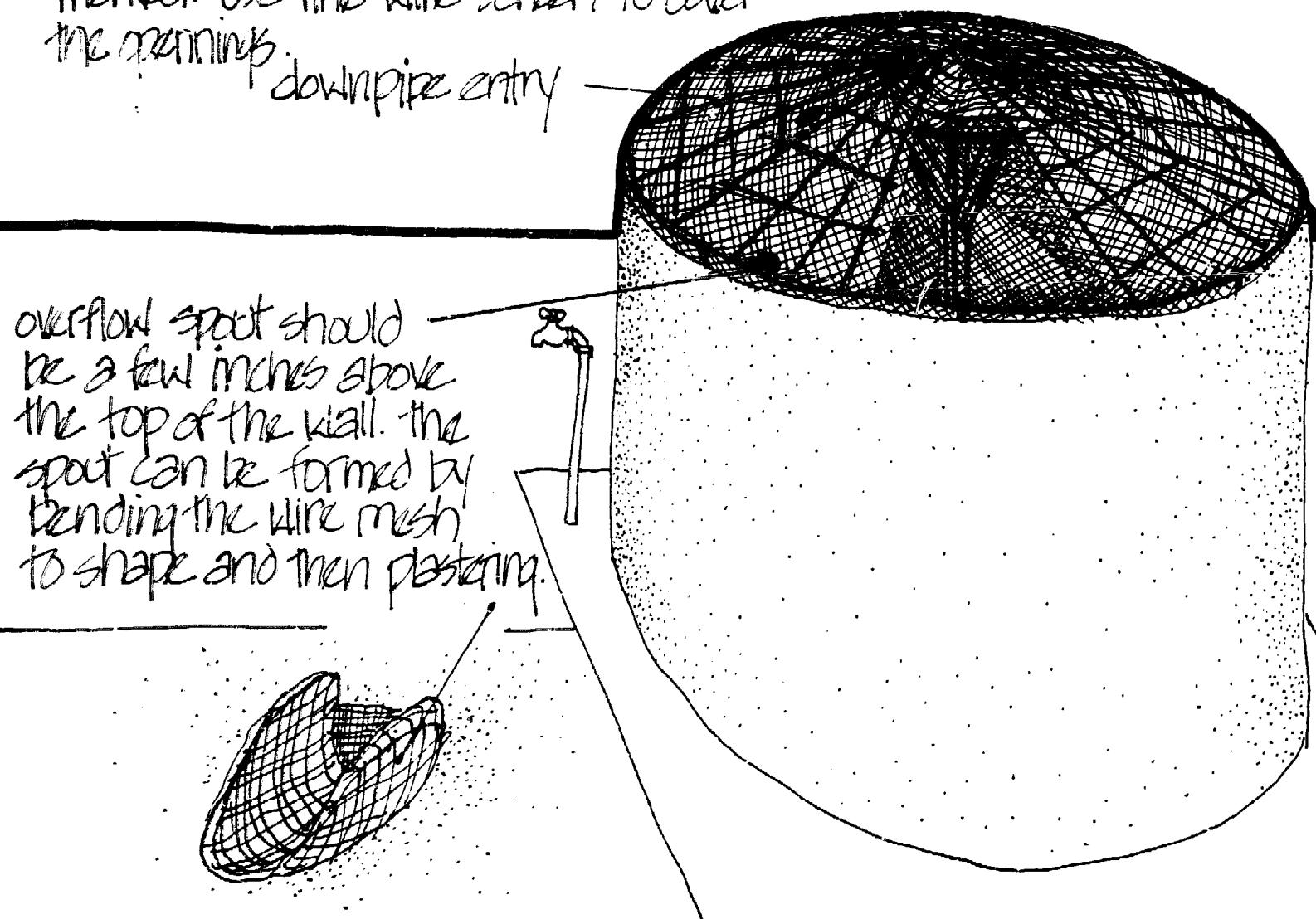


4'x8'x 1/2" plywood

the plywood forms are placed around the tank, the wider part meeting the top of the wall. the forms are supported by the 6' 2x2's used to hold the tank wall form. a support should catch 2 forms at the bottom corners, leave one section open for entry and to pull out the forms.

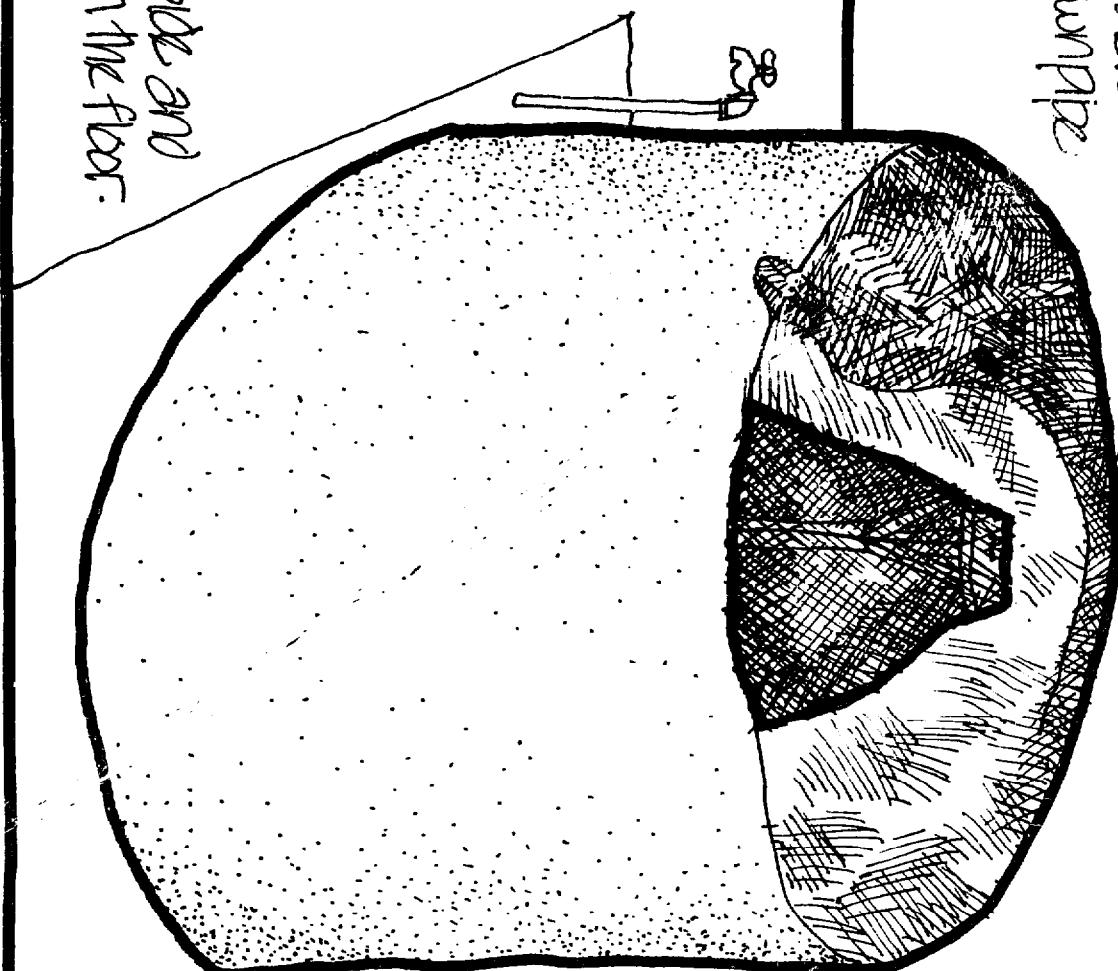


Wire mesh is tied to mesh extending from tank walls; covering the roof. Next $\frac{1}{4}$ " steel running from the peak to the walls is tied at 8" centers around the wall perimeter and tied with cross pieces of $\frac{1}{4}$ " steel at 10" spacings. the plugs for the overflow and the spotting (downpipe) entry are marked. Use fine wire screen to cover the openings.



A first coat of mortar (1:3 mix) is trowelled on and after this dries, a second coat is applied. This is allowed to dry before a finish coat is applied.

The fine wire screen is plastered over the overflow and downpipe openings.

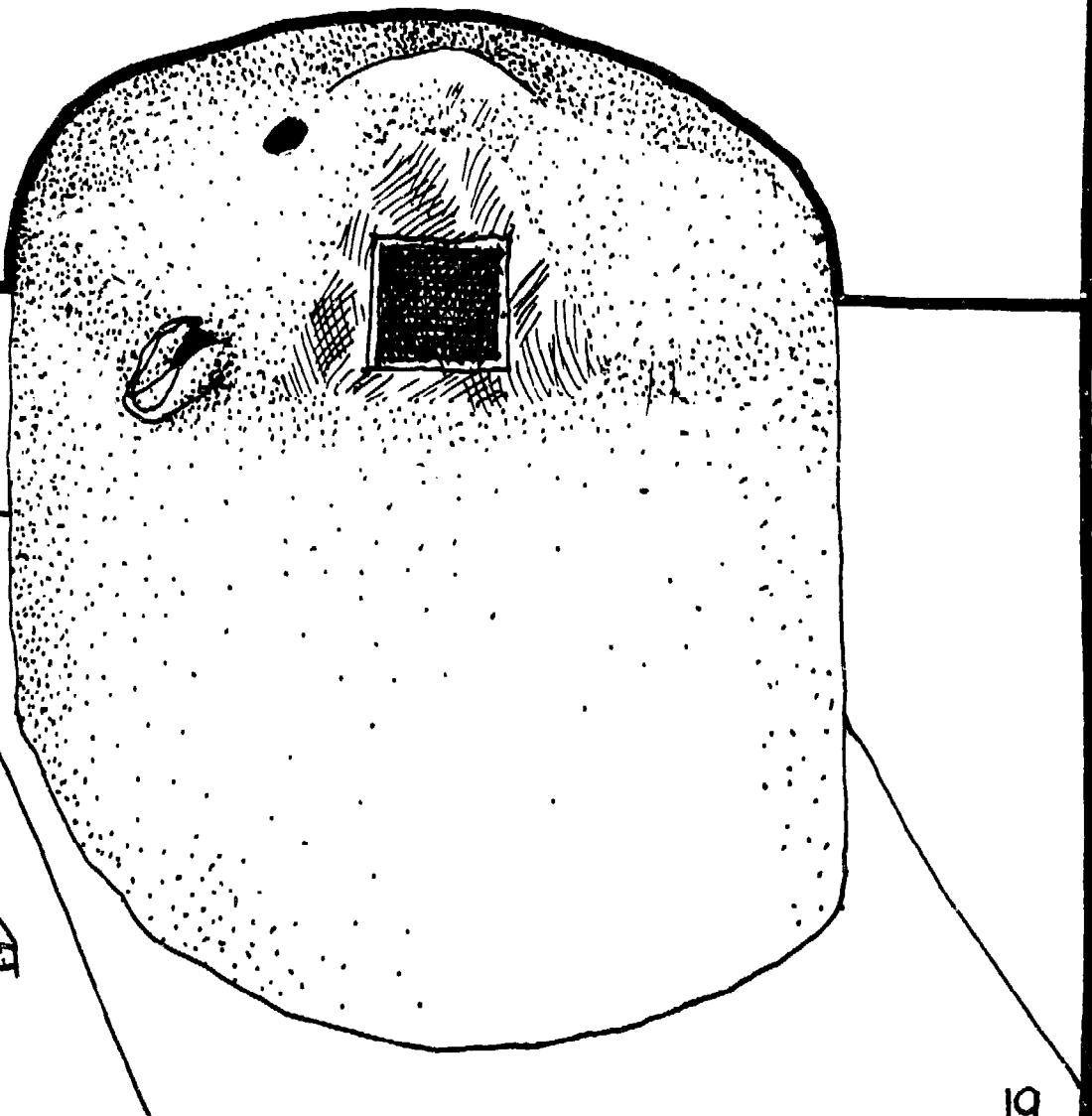


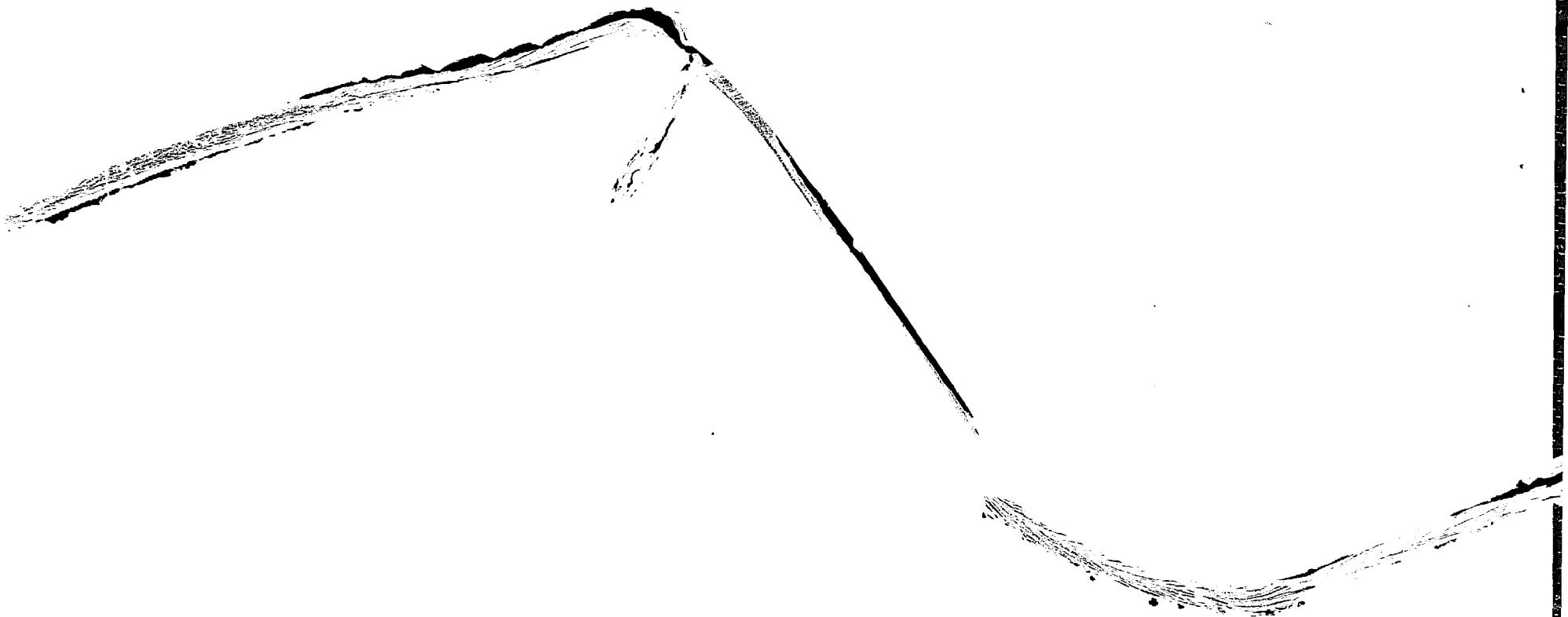
Keep tank wet on the outside and allow some water to stand on the floor.

after the finish coat has dried for 24 hours, the formwork is removed and the remaining section is cast with a 2' x 2' hatch, the rim made of 2x2 pine embedded in the 2nd coat of plaster, with an exposed 1" above the finish coat of plaster. the tank roof is then given a coat of plaster on the inside.

the walls and floor are then painted with a thick mixture of cement or cement and waterproofing.

allow water to sit in the tank covering the floor for 1 week.





A construction manual created by
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Printed by Letchworth Press

Published by CEDAR Press
P.O. Box 616
Bridgetown, Barbados, W.I.